FCC Part 15

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Plug the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

This device complies with Part 15 of the FCC rules. Operation is subject to the following conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference that may cause undesired operation.

WARNING: Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Industry Canada

This Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numerique de la classe B respecte toutes les exigences du Reglement sur le materiel brouilleur du Canada.

Quick Reference Guide

Models MT2834ZDX, MT2834ZDXb, MT2834ZDXI, MT2834DXK

P/N 82034908 Revision I (3/5/99)

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Record of Revisions

Revision	*Date*	*Description*
I	3/5/99	Updated agency, technical support, BBS, and Internet sections; added URLs; deleted CompuServe section.

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1

Introduction

Congratulations

Congratulations on your purchase of the MT2834ZDX fax modem, one of the finest fax modems available today from one of America's oldest and most respected modem manufacturers. The MT2834ZDX complies with the international V.34 standard for a top speed of 28,800 bits per second (bps). The MT2834ZDXb complies with the enhanced V.34 standard for a top speed of 33,600 bps. Both models are downward compatible with all previous standards, including V.32terbo (19,600 bps), V.32bis (14,400 bps), V.32 (9600 bps), V.22bis (2400 bps), and V.22 (1200 bps). Both are full-duplex intelligent modems with V.42 error correction, V.42bis data compression, and V.17 (14,400 bps), Class 2, Group 3 fax capabilities.

This reference guide is for the MT2834ZDX (standard), MT2834ZDXb (33,600 bps), MT2834ZDXK (UK), and MT2834ZDXI (international) versions of the modem. Except where specifically noted, references to the MT2834ZDX should be understood to apply to all versions, whereas references to the ZDX, ZDXb, ZDXK, and ZDXI refer to specific versions.

In addition to this *Quick Reference Guide*, which you received with your modem, a complete *Owner's Manual* is available for the MultiModemZDX series of modems. The *Owner's Manual* provides more detailed information on the operation of your modem, including full descriptions of all AT commands. It also provides a glossary of terms, and chapters on modem basics, configuring, and testing.

The complete *Owner's Manual* is available as a free Windows Help file. You will find instructions for downloading it from the Multi-Tech BBS on pages 21–25 of this guide. With the Windows Help version on your computer, help is never more than a few clicks away.

What Is in My Modem Package?

Your MT2834ZDX package has several components. Make sure you have them all before trying to operate your modem. Your package should include:

- One MT2834ZDX data/fax modem
- One DC power supply
- One set of four plastic feet
- Two sets of Velcro fasteners
- One telephone cable
- A communications software disk
- This *Quick Reference Guide*

If any of these items are missing, please contact Multi-Tech Systems or your dealer/distributor (see Appendix C for information on contacting Multi-Tech via telephone, fax, bulletin board service, and the Internet).

2

Quick Start

Introduction

We know you're eager to get your Multi-Tech MultiModemZDX fax modem up and running, so we'll skip the features for now, and show you step-by-step how to set it up, check it out, and make your first calls.

What You'll Need

Before starting, please make sure you have everything you need:

We supply

- The MT2834ZDX data/fax modem
- A DC power supply module
- One set of four plastic feet
- Two sets of hook-and-loop fasteners
- One telephone cable
- A communication software disk
- This *Quick Reference Guide*

You supply

- A computer with an unused serial port
- A shielded RS-232 serial cable with a male DB-25 connector on one end and a connector to match your computer's serial port on the other end
- A nearby AC power outlet
- A nearby telephone line jack

If you are unfamiliar with computers, please see Chapter 3, "Features," for more information about the required equipment before you proceed.

Safety Warnings

- Use this product only with UL- and CUL-listed computers.
- To reduce the risk of fire, use only 26 AWG or larger telephone wiring.
- Never install telephone wiring during a lightning storm.
- Never install a telephone jack in a wet location unless the jack is specifically designed for wet locations.
- Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.
- Use caution when installing or modifying telephone lines.
- Avoid using a telephone (other than a cordless type) during an electrical storm. There may be a remote risk of electrical shock from lightning.
- Do not use a telephone in the vicinity of a gas leak.

Step 1: Place the Modem

Place the modem near your computer. You can use either plastic feet or hook-and-loop patches to mount it. To apply the feet, peel them off the backing strip, and press them into the recesses on the bottom of the modem. Alternately, or additionally, you can use the included self-adhesive hook-and-loop patches to mount the modem to a vertical surface or to keep it from being dislodged on a horizontal surface. If you use the hook-and-loop patches, we recommend that you mount them where they will not obscure the labels or screws on the bottom of the modem.

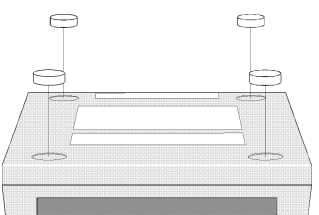

Figure 2-1. Mounting the feet.

Step 2: Connect the Modem to Your System

Placing the MT2834ZDX in a convenient location, connect it to your computer's serial port, to the telephone line, to AC power, and, optionally, to your telephone.

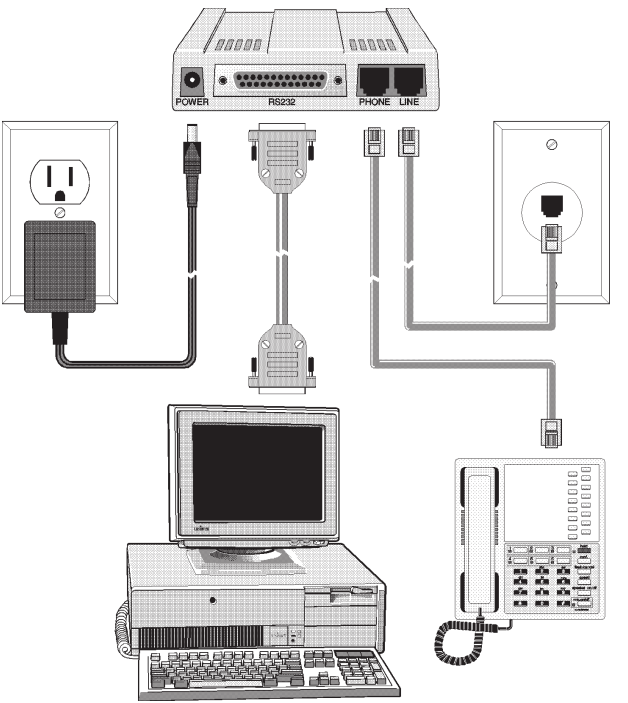

Figure 2-2. MT2834ZDX connections.

RS232 Connection

Plug one end of the serial cable into the RS232 connector on the modem, and the other end into a serial port connector on your computer, such as COM1 or COM2.

LINE Connection

Plug one end of the phone cable into the MT2834ZDX's LINE jack, and the other end into a phone line wall jack.

Note: The ZDX's LINE jack is not interchangeable with the PHONE jack. Do not plug the phone into the LINE jack or the line cable into the PHONE jack.

Note: The Federal Communications Commission (FCC), Industry Canada, and the British Approvals Board for Telecommunications (BABT) impose certain restrictions on equipment connected to public telephone systems. See Appendix A for more information.

PHONE Connection

You may optionally plug a telephone into the ZDX's PHONE jack. This jack is provided as a convenience; you may also plug a telephone into a duplex jack inserted into your wall jack.

POWER Connection

Plug the power supply module into an AC power outlet or power strip. Plug the power supply's cable into the POWER jack on the modem.

Note: Use only the power supply supplied with the MT2834ZDX. Use of any other power supply will void the warranty and could damage the modem.

Power-On Test

Test the modem by turning it on (a power on/off switch is located on the right side). When you apply power, the modem performs a diagnostic self-test, indicated by the speed indicators flashing in sequence for a second or two, after which the 28 indicator should light. If this does not happen, check that the power switch is on, the power supply is solidly connected, and the AC outlet is live. If these measures do not work, see Chapter 6, "Troubleshooting Your Fax Modem."

Step 3: Install the Modem in Windows

If you use Windows 95, Windows 98, or Windows NT 4.0, you must install the modem in the operating system. (If you use Windows 3.1 or another operating system, skip to Step 4.)

Adding the Modem to Windows

1. Make sure your modem is connected properly, then turn on your computer. Windows should detect your new modem and open the **Install New Modem** wizard.

   Note: If Windows cannot detect your modem, the modem may be turned off, it may be unplugged, it may be plugged into the wrong connector on your computer, or the serial cable may be faulty. See "None of the LEDs Light When the Modem Is Turned On" and "The Modem Does Not Respond to Commands" in Chapter 7 of the *User Guide*, "Solving Problems."

   ---

2. If Windows identifies your modem correctly as a MultiTech Multi-Modem or a MultiModem MT2834ZDX, click **Next** to install the modem. After the modem is installed, click **Finish** to exit.
3. If Windows cannot identify your modem (for instance, if it identifies your modem as a "Standard Modem"), click **Change**. A dialog box with a list of manufacturers and a list of modems appears.
4. Select **Multitech Systems** from the **Manufacturers** list.
5. Select **MultiModem MT2834ZDX** from the **Models** list.
6. Click **Next**. Windows installs and configures the modem.
7. Click **Finish** to exit.

Removing Your Old Modem from Windows

When a new modem replaces another modem, the old modem installation remains in Windows after you install the new modem, and the old modem is still selected in HyperTerminal and other Windows 95 or NT applications. Although you can change the application connection descriptions one at a time, it is easier to force Windows applications to use the new modem by removing the old modem from Windows.

1. Click the **Start** button, point to **Settings**, and click **Control Panel**.
2. Double-click the Modems icon to open the **Modems Properties** dialog box.
3. In the list box, select the old modem.
4. Click **Remove**, then click **Close**.
5. The next time you dial a HyperTerminal connection, it will select your new modem and ask you to confirm the selection.

Step 4: Install and Configure Your Software

You must have communications software installed in your computer to use the MT2834ZDX. If you wish to use communications software that is already installed, you should reconfigure it for the MT2834ZDX; otherwise, install the data and fax communications software provided with the MT2834ZDX (see software documentation for installation instructions).

1. Install communications software, if necessary.
2. Turn on your computer and run the communications software.
3. Find the dialog box or menu that lets you specify your modem. (In Windows Terminal select **Settings** | **Modem Commands**; in HyperTerminal select **File** | **Properties** | **Phone Number**; in ProComm Plus for Windows select **Window** | **Setup** | **Advanced**; and in Trio select **View** | **Datacomm** | **Communications** | **Setup** | **Modem** | **Select from List**.
4. Choose your modem from the software's modem list. If it isn't listed, choose a generic modem and modify the settings as necessary.
5. Change the modem initialization string, if necessary. The factory default configuration works well for most purposes. To load the factory default configuration, use **AT&F**. To load a custom configuration that was saved using the ***&W*** command, use **ATZ**. Note that the ***Z*** command must be in a command string by itself. For a Macintosh, the initialization string should include the ***&D0*** command. If you do not want the modem to always answer the phone, add **S0=0** to the string. Depending on the software, you might have to end the string with a carriage return character (**^M**).

Note: To change the modem's default configuration, type new commands in the software's terminal window, adding the ***&W*** command to store them in the modem's nonvolatile memory. For instance, to

create a default configuration for a Macintosh computer that turns off autoanswer, type **AT&F&D0S0=0&W**. The new configuration loads automatically whenever the modem is turned on or receives the **ATZ** command.

6. Select the port the modem is connected to (normally COM1 or COM2).

7. Select your serial port speed. This can be labeled “maximum speed,” “DTE bps,” or “baud rate.” Ideally, if you use data compression, you should set your serial port baud rate to four times the modem’s maximum transmission speed or faster; however, few files can be compressed enough to require speeds that high, and not all serial ports can handle speeds that high. Set the serial port baud rate to 115,200 bps if your computer has a high speed serial port with a 16550AFN UART or equivalent and Windows 95 or NT 4.0, or set it to 57,600 bps if it has Windows 3.1x. If you have an older computer with a 14550 UART, set it to 19,200 bps. Older Macintosh computers can use a serial port baud rate of 57,600 bps; newer ones can use a serial port baud rate of 115,200 bps or 230,400 bps.

   To see what UART your serial port uses if you have Windows 3.1x, in Program Manager select **File** | **Run**, type **MSD**, and press ENTER. Select **COM Ports** to see the UART type. If you have Windows 95, select **Start** | **Settings** | **Control Panel**, and double-click on the Modems icon. In the **Modems Properties** dialog box, click the **Diagnostics** tab, click the port the modem is connected to, and click **More Info** to see the UART type. Note that both programs will identify a 14550 UART as an 8250A UART. If you have an 80386 or later computer, your UART is most likely a 14550 or 16550AFN.

8. If the software has an autobaud selection, make sure it is disabled. Autobaud applies only to older modems, and can cause problems if enabled.

9. If the software allows you to edit the no-connect messages (*NO CARRIER, BUSY, NO ANSWER, NO DIALTONE*), make sure there is no space between *DIAL* and *TONE* in *NO DIALTONE*.
10. Refer to the software manual or online Help for other configuration choices; in most cases you can accept the default values.

Step 5: Call the Multi-Tech BBS

Test the modem's data functions by calling the Multi-Tech Bulletin Board System (BBS) and downloading ZDXHELP.HLP, which contains the full *MultiModemZDX Owner's Manual* in convenient Windows Help format.

Windows HyperTerminal

1. Click **Start**; then choose **Programs**, **Accessories**, and **HyperTerminal.**
2. Start HyperTerminal by double-clicking on the Hypertrm icon. HyperTerminal asks for the name of the connection.
3. Type **Multi-Tech BBS** in the **Name** box and click **OK**.
4. In North America, type **800** in the **Area code** box and **392-2432** in the **Phone number** box. Local and international users, type **612** in the **Area code** box and **785-3702** in the **Phone number** box.
5. Verify that your modem is selected in the **Connect using** box, then click **OK**.
6. In the **Connect** dialog box, click **Dialing Properties**.
7. Make any necessary changes in the **Where I am** and the **How I dial from this location** boxes. If you must dial *9* to access an outside line, you should type **9** in both the local and the long distance boxes unless your phone system has a special requirement.

8. Click **OK**, and then click **Dial**. You will know you have reached a modem by the harsh sounds of the modem handshake.
9. When the BBS welcome screen appears in the HyperTerminal window, type your first name, last name, and password following the prompts. If you are a first-time caller, the BBS asks if your name is spelled correctly. If you answer **Y**, a questionnaire appears. You must complete the questionnaire to use the BBS on your first call.
10. Press ENTER until the main menu appears. From the main menu you have access to two areas: the File Menu and News. For help with menu commands, type **?**.
11. In the Main Menu, type **F** and press ENTER to access the File Menu, then type **D** and press ENTER to download.
12. At the file name prompt, type **zdxhelp.hlp** and press ENTER.
13. Press ENTER twice more.
14. Type **Z** and press ENTER to select the Zmodem transfer protocol.
15. The download begins automatically. As the file is copied to the HyperTerminal folder, a dialog box reports on the progress of the download. If the download fails, your baud rate may be set too high. Log off, set the COM port baud rate lower, and call again.
16. To log off the BBS, press ENTER, type **G** for “good-bye,” and press ENTER twice more.
17. In the HyperTerminal window, click **File**, then click **Save** to save the HyperTerminal connection description.

Windows Terminal

1. Open the Accessories program group and double-click on the Terminal icon.
2. Select the **Settings** menu and make the following changes:

   Phone Number: Type **1-800-392-2432** if you are in North America, or type an overseas access code and **612-785-3702** if you are outside North America.

   Communications: Select the COM port the modem is connected to and change the following: **Baud rate** to **19200**; **Flow control** to **Hardware**; and **Carrier Detect** to checked.

   Modem Commands: Select **MultiTech**. If you must dial *9* to get an outside line, type **ATDT9,** in the **Dial prefix** box (include the comma).
3. Click **File**, then click **Save**, and save as **multibbs.trm**.
4. Click **Phone**, then click **Dial** to dial the BBS. You will know you have reached a modem by the harsh sounds of the modem handshake.
5. When the BBS welcome screen appears in the Terminal window, type your first name, last name, and password following the prompts. If you are a first-time caller, the BBS asks if your name is spelled correctly. If you answer **Y**, a questionnaire appears. You must complete the questionnaire to use the BBS on your first call.
6. Press ENTER until the main menu appears. From the main menu you have access to two areas: the File Menu and News. For help with menu commands, type **?**.
7. In the Main Menu, type **F** and press ENTER to access the File Menu, then type **D** and press ENTER to download.
8. At the file name prompt, type **zdxhelp.hlp** and press ENTER.
9. Press ENTER twice more.

10. Type **X** and press ENTER to select the Xmodem transfer protocol.
11. To begin the download in Terminal, click **Transfers,** then click **Receive binary file**. Next, select the destination directory, type the file name (**zdxhelp.hlp**), and click **OK**. If the download fails, your baud rate may be set too high. Log off, set the COM port baud rate lower, and call again.
12. To log off the BBS, press ENTER, type **G** for "good-bye," and press ENTER twice more.

Running MultiModemZDX Help

Windows 95, 98, or NT 4.0

1. Open the folder into which you downloaded the ZDXHELP.HLP file.
2. Move the file to a permanent location on your hard drive.
3. Double-click on the Zdxhelp icon to run MultiModemZDX Help.
4. Press F1 for help in using MultiModemZDX Help.

Windows 3.x

1. Open the directory into which you downloaded the ZDXHELP.HLP file.
2. Move the file to a permanent location on your hard drive.
3. In File Manager, select ZDXHELP.HLP, then click on **File**, **Associate**.
4. In the **Associate With** box, type **winhelp.exe,** and then click **OK**.
5. Double-click on the ZDXHELP.HLP file name to run it.
6. To create an icon for easier access to MultiModemZDX Help, drag the ZDXHELP.HLP file name from File Manager into any Windows program group, such as Main.

References

The World Wide Web is an excellent source of information about modems in general and modem installation, configuration, and troubleshooting in particular. The following Web sites are good places to start:

- Costmo's Other Resources Page:
  http://modems.rosenet.net/or/
- Curt's High Speed Modem Page:
  http://elaine.teleport.com/~curt/modems.html
- Data Communications FAQ:
  http://www.best.com/~malch/comfaq.html
- Multi-Tech Systems, Inc.:
  http://www.multitech.com/

3

Features

What Can I Do with My MultiModemZDX?

Your MT2834ZDX is the gateway to the exciting world of telecommunications.

You can use it to access commercial online information services such as CompuServe, America Online, Genie, and Prodigy. These services provide access to databases, encyclopedias, stock reports, news, weather, and shopping. They provide electronic mail (e-mail) links to subscribers of the same and other services. Public message areas called forums allow subscribers to trade information and opinions on a vast array of topics from A to Z, while vendor forums provide hardware and software support from Multi-Tech and other manufacturers. Online services also allow you to upload and download computer programs, data files, and updated software such as video and printer drivers.

The MT2834ZDX can also connect you to the Internet, an international computer network of universities, libraries, businesses, and government agencies. Like the commercial online services, the Internet provides e-mail services, public message areas, and access to information and software, much of it easily accessed through the World Wide Web.

You can also use the MT2834ZDX to dial into bulletin board services (BBS's). BBS's offer some of the services provided by online information services—usually e-mail, public message areas, and file transfers. Most are run as hobbies by individuals, but some are services provided by companies like Multi-Tech. Though some charge an annual fee, many are free.

Other uses include direct links to friends with modems, to banks, and to service bureaus. You can also telecommute with your fax modem—work at home while communicating with the office by modem or fax.

And of course, you can use your MT2834ZDX to send and receive faxes anywhere in the world, enabling you to communicate quickly with businesses and other organizations that do not maintain BBS's.

Features

The MT2834ZDX automatically adjusts to line conditions and to the capabilities of the modem it connects to, resulting in the highest transmission speed, the most accurate error correction, and the most efficient data compression possible for each connection. The MT2834ZDX follows the ITU-T V.34 specification for data rates as high as 28,800 bps over public telephone lines, while the MT2834ZDXb follows the most recent revision of the V.34 specification for data rates up to 33,600 bps.

The MT2834ZDX's features include:

- Support of data rates of 33,600 and 31,200 bps (ZDXb only), 28,800, 26,400, 24,000, 21,600, 19,200, 16,800, 14,400, 12,000, 9600, 7200, 4800, 2400, 1200, and 300 bps for communicating with older modems as well as with other V.34 modems.
- Automatic fallback to slower speeds in noisy line conditions, and fall-forward to faster speeds as conditions improve.
- ITU-T V.42 LAP-M and MNP Classes 2–4 error correction.
- Data transfer rates up to 115,200 bps with V.42bis data compression.
- Serial port data rates adjustable to 115,200 bps.
- Autodial, redial, pulse (rotary) and touch-tone dial.
- Dial tone and busy signal detection for reliable call progress reporting.
- Compatibility with the standard AT command set used by most communication programs.
- On-screen help menus.
- Nonvolatile memory for storage of custom settings and two telephone numbers.
- Sends and receives faxes from your computer at 14,400, 9600, 4800, and 2400 bps.
- Responds to EIA TR29.2 Class 2 fax commands.

Required Equipment

In addition to the contents of the MT2834ZDX package, you need the following equipment.

Computer

The MT2834ZDX can be connected to any computer with an RS-232C/V.24 serial port, such as the IBM PC, XT, AT, and PS/2 computers, and most PC compatibles. It can also be connected to the RS-422 serial ports on Apple Macintosh computers. To use your MT2834ZDX at its highest speeds, a PC must have either a serial port with a 16550AFN UART or a Multi-Tech ISI (Intelligent Serial Interface) card, such as the ISI551 (single port), ISI552 (dual port), or the ISI608 (eight ports). A 16550AFN UART can safely handle data at rates up to 115,200 bps. Almost all Macintoshes can handle data rates up to 57,000 bps, while the newer ones can handle data rates up to 115,000 bps.

Serial Cable

To connect the MT2834ZDX to your computer, you must provide a serial cable, obtainable at computer stores and many office supply stores. The cable should have a male DB-25 connector at the modem end. For IBM and compatible computers, the other end may have a female DB-25 connector or a female DB-9 connector, depending on your computer. Most Macintosh computers require a round, 8-pin, mini-DIN connector. The Macintosh serial cable should be wired for hardware flow control. To reduce electrical interference, the FCC requires that the cable be shielded.

Telephone Line

You must have a telephone line with a jack (connector) that accepts the cable that comes with the MT2834ZDX. If you do not have a telephone jack near your computer, you should install one before proceeding.

In North America, do-it-yourself telephone extension kits and accessories are available wherever telephones are sold. You may also hire an independent contractor or your local telephone company to do the work. If you want a separate line for your fax modem, you must contact your telephone company.

Communications Software

To operate the MT2834ZDX, you must have data communication (datacomm) and fax communication software. All versions come with a data and fax communications package. You must have Microsoft Windows 3.1 or later to run this software. If you require software for DOS or for the Macintosh operating system, please contact Multi-Tech Sales at (612) 785-3500 or (612) 785-9874 (fax). The MT2834ZDX is also compatible with other datacomm and fax programs.

Connections

All models connect to your computer (“RS232”), to a telephone line (“LINE”), to a power source (“POWER”), and, optionally, to a telephone set (“PHONE”).

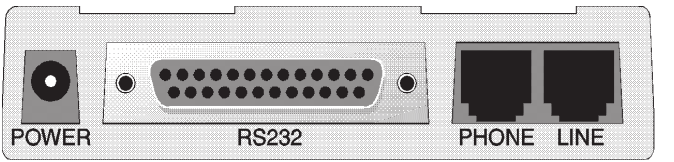

Figure 3-1. ZDX connectors.

Connecting to the Computer (“RS232”)

Using a matching serial cable, connect the RS232 connector on the modem to one of the serial port connectors on the back of your computer. On an IBM PC or compatible, there are usually two serial ports named “COM1” and “COM2.” COM1 typically uses a DB-9 connector, whereas COM2 may use a DB-25 connector. Most Apple Macintosh computers use round mini-DIN-8 connectors for the serial ports. Choose the one marked with the icon of a telephone; the Macintosh gives priority to that port and will not interrupt your communications link. Be sure to tighten the mounting screws on the DB connectors.

Connecting to the Telephone Line (“LINE”)

Plug one end of the cable provided with the MT2834ZDX into the telephone jack in your home or office. Plug the other end into the LINE jack on the MT2834ZDX.

Note: The ZDX's LINE jack is not interchangeable with the PHONE jack. Do not plug the telephone into the LINE jack or the line cable into the PHONE jack.

Note: The Federal Communications Commission (FCC), Industry Canada, and the British Approvals Board for Telecommunications (BABT) impose certain restrictions on equipment connected to public telephone systems. See Appendix A for more information.

Connecting a Telephone Set (“PHONE”)

If you wish to connect a telephone to the same line as the ZDX, you may plug it into the latter's PHONE jack. This connector is provided as a convenience; you may also connect your telephone to a duplex jack inserted into your wall jack.

Note: The PHONE jack is not interchangeable with the LINE jack; do not plug the telephone into the LINE jack or vice-versa

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Connecting to Power ("POWER")

Low voltage DC power is supplied to the MT2834ZDX through a modular power supply included with the modem. Plug the power supply module into a convenient AC power outlet or surge protector. Plug the connector on the other end of the power cord into the POWER jack on the modem. A power on/off switch is located on the right side of the modem.

Note: Use only the power supply supplied with the MT2834ZDX. Use of any other power supply will void the warranty and could damage the modem.

As soon as you apply power to the modem, it will perform a diagnostic self-test, indicated by the speed LEDs flashing in sequence for approximately two seconds, after which the 28 indicator should light. If this does not happen, check that the power switch is on, the power supply is solidly connected, and the AC outlet is live.

Surge Protectors and Lightning

Power surges and other transient voltages on power lines, such as those caused by lightning strikes, can damage or destroy your modem. Damaging voltages can also enter your modem through the telephone line, especially during an electrical storm. Therefore, we recommend that you plug the MT2834ZDX into a surge protector rather than directly into a wall outlet, preferably a surge protector that provides protection against electrical spikes on the telephone line as well as on the power line. Note that not even a surge protector can guard against damage from a nearby lightning strike. During an electrical storm, your safest course is to unplug your computer equipment from both the power outlet and the telephone line.

Front Panel

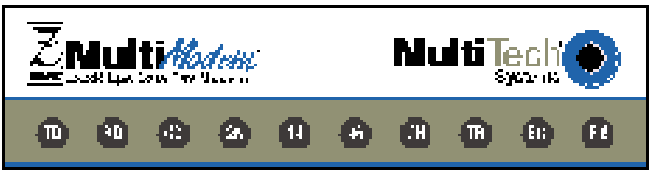

Figure 3-2. ZDX front panel

The MT2834ZDX has ten LED indicators on the front panel that indicate status, configuration, and activity:

- **Transmit Data.** The TD LED lights when the modem is transmitting data to another modem. The state of the LED matches the TD circuit on pin 2 of the RS-232C/V.24 interface.
- **Receive Data.** The RD LED lights when the modem is receiving data from another modem. The state of the LED matches that of the RD circuit on pin 3 of the RS-232C/V.24 interface.
- **Carrier Detect.** The CD LED lights when the modem detects a valid carrier signal from another modem. It is on when the modem is communicating with the other modem and off when the link is broken.
- **28,800–33,600 bps.** The 28 LED (33 LED on the ZDXb) lights by itself when the modem connects at 28,800 bps, blinks slowly to indicate 31,200 bps, and blinks fast to indicate 33,600 bps operation. This LED also lights or blinks in combination with the 14 LED to indicate speeds between 16,800 and 26,400 bps (see table).
- **14,400 bps.** The 14 LED lights by itself when the modem connects at 14,400 bps. The 14 LED lights or blinks in combination with the

28 LED to indicate speeds between 16,800 and 26,400 bps (see table). It lights together with the 96 LED to indicate a speed of 12,000 bps.

- **9600 bps.** The 96 LED lights when the modem connects at 9600 bps. If no speed LED lights, the modem is operating at less than 9600 bps.
- **Off-Hook.** The OH LED lights when the modem is off-hook, which occurs when the modem is dialing, online, or answering a call. The LED flashes when the modem pulse-dials.
- **Terminal Ready.** The TR LED lights when a datacomm program initializes the modem. It means the modem is ready for an outgoing or incoming call. It goes off when the datacomm program disconnects the COM port. When it goes off, a connected modem will disconnect. The state of the TR LED matches that of the DTR circuit on pin 20 of the RS-232C/V.24 interface.
- **Error Correction (V.42).** The EC LED lights continuously when the modem is in error correction mode, and blinks when compression is activated.
- **Fax.** The FX LED lights when the modem is in fax mode.

Note: When you turn on the MT2834ZDX, the speed lights flash briefly as the modem does a self-test, then the LED for the default modem baud rate lights. The default rate for the MT2834ZDX is 28,800 bps (33,600 bps for the ZDXb) unless you select and store another baud rate. After a call, the LEDs for the connection's baud rate remain lit until another call is made or the modem is reset. If you connect at a rate under 9600 bps, all speed LEDs remain off after the connection is broken, even though the modem is still turned on.

Speed Indicator Blink Rates

The 28 (33), 14, and 96 speed indicators light singly or in combination to indicate data rates. Data rates for the ZDX are shown in the following table. Data rates for the ZDXb are shown on the inside back cover.

MT2834ZDX Data Rates

Data Rate (bps)	28 LED	14 LED	96 LED
< 9.6K	●	●	●
9.6K	●	●	○
12.0K	●	○	○
14.4K	●	○	●
16.8K (V.32terbo)	●	☼	●
19.2K (V.32terbo)	●	☼	●
16.8K (V.34)	○	☼	●
19.2K (V.34)	○	☼	●
21.6K	○	○	●
24.0K	☼	○	●
26.4K	☼	☼	●
28.8K	○	●	●

● Off ☼ Slow blink (1/sec)
○ On ☼ Fast blink (5/sec)

4

AT Commands, S-Registers & Result Codes

AT Commands

This section summarizes your modem's AT commands. For detailed information on the commands, download the ASCII text or Windows Help versions from the Multi-Tech BBS (see "Step 5: Call the Multi-Tech BBS" in Chapter 2).

Command:	**AT**	**Attention Code**
Values:		n/a
Description:		The attention code precedes all command lines except **A/**, **A:**, and escape codes.

Command:	**RETURN Key**	
Values:		n/a
Description:		Press the RETURN (ENTER) key to execute most commands.

Command:	**A**	**Force Answer Mode**
Values:		n/a
Description:		Answer call before final ring.

Command:	**A/**	**Repeat Last Command**
Values:		n/a
Description:		Do not precede this command with **AT**. Do not press RETURN to execute.

Command:	**A:**	**Continuous Redial**
Values:		n/a
Description:		Redial last number until answered (10 redials in DOC modems). Do not precede this command with **AT** or press RETURN to execute. (Not available on ZDXK or ZDXI modems.)

Command:	**&A*n***	**Answerback**
Values:		*n* = 0 or 1
Default:		0
Description:	&A0	Disables answerback.
	&A1	Enables answerback reply to an ID request.

Command:	**$A*n***	**Auto-Reliable Buffering**
Values:		*n* = 0 or 1
Default:		0
Description:	$A0	Discard data received during establishment of a reliable connection.
	$A1	Buffer data received during establishment of a reliable connection.

Command:	**#A*n***	**Auto Speed Detection in Answer Mode**
Values:		*n* = 0–3
Default:		0
Description:	#A0	Start at maximum speed and fall back to a lower speed (26400, 24000, 21600, 19200, 16800, 14400, 12000, 9600, 7200, 4800, 2400, 1200, or 300 bps) as line conditions warrant.
	#A1	Maximum speed only.
	#A2	Start at maximum speed and fall back decrementally to 4800 bps only.
	#A3	Start at 2400 bps and fall back to 1200 to 300 bps only.

Command:	**B*n***	**Answer Tone** (ZDXI modems only)
Values:		*n* = 1
Default:		1
Description:	B1	Select Bell answer tones, including Bell 103.

Command:	**&BS*n***	**Maximum Reliable Block Size**
Values:		*n* = 0 or 1
Default:		1
Description:	&BS0	Maximum transmit block size of 64 characters.
	&BS1	Maximum transmit block size of 256 characters.

Command:	**$BA*n***	**Baud Adjust**
Values:		*n* = 0 or 1
Default:		0
Description:	$BA0	Set baud adjust off, speed conversion on. (Serial port speed is independent of modem data rate.)
	$BA1	Set baud adjust on, speed conversion off. (Serial port speed is same as modem data rate.)

Command:	**&C*n***	**Carrier Detect Control**
Values:		*n* = 0, 1, 2, or 4
Default:		1
Description:	&C0	Force Carrier Detect high.
	&C1	Let Carrier Detect follow carrier signal.
	&C2	Let Carrier Detect drop on disconnect, then go high again (for some CBX phone systems).
	&C4	Reset modem when Carrier Detect drops.

Command:	**&CD*n***	**Cleardown at Disconnect**
Values:		*n* = 0, 1
Default:		0
Description:	&CD0	Execute a cleardown at disconnect.
	&CD1	Do not execute a cleardown at disconnect.

Command:	**D*s***	**Dial**
Values:		*s* = dial string (phone number and dial modifiers)
Default:		none
Description:		Dial telephone number *s*, where *s* may include up to 60 digits and **T**, **P**, **R**, comma, colon, and semicolon characters.

Command:	**D*s*N*d***	**Store Telephone Number**
Values:		*s* = dial string (phone number and dial modifiers) *d* = 0 or 1
Default:		none
Description:		To store, enter **D** followed by dial string *s*, then **N** followed by directory number *d*. Example: **ATDT9,5551212N1**.

Command:	**&D*n***	**Data Terminal Ready Control**
Values:		*n* = 0–3
Default:		2 (ZDX, ZDXI, ZDXK) 0 (ZDX-Mac, ZDXK-Mac)
Description:	&D0	Modem ignores DTR signal.
	&D1	When DTR drops, the modem hangs up. While DTR is low, the modem accepts commands but will not dial or auto-answer until DTR goes high again.
	&D2	Same as **&D1**.
	&D3	When DTR drops, the modem hangs up and resets as if an **ATZ** command were issued.

Command:	**$D*n***	**DTR Dialing**
Values:		*n* = 0 or 1
Default:		0
Description:	$D0	Do not dial when DTR goes high.
	$D1	Dial stored number N0 when DTR goes high.

Command: **%DC*n* AT Command Control**
Values: *n* = 0 or 1
Default: 0
Description: %DC0 The modem responds to AT commands.
%DC1 The modem ignores AT commands.

Note: The modem will respond to **AT%DC** for 10 seconds after power-up.

Command: **%DF*n* Format Line Probe Data**
Values: *n* = 0 or 1
Default: 0
Description: %DF0 Display data in graph format. Y axis is gain shown in dBm.
%DF1 Display data in table format. Gain is shown numerically in dBm at 75Hz increments from 150Hz to 3750Hz.

Command: **%DP*n* Read Line Probe Data**
Values: *n* = 0 or 1
Default: 0
Description: %DP0 Do not read and store line probe information from DSP during handshake.
%DP1 Read and store line probe information from DSP during handshake.

Command: **>DT*n* DTMF Detection**
Values: *n* = 0 or 1
Default: 0
Description: >DT0 The modem will not detect DTMF tones.
>DT1 The modem will detect and report DTMF tones when it is off-hook.

Command:	**E*n***	**Echo Command Mode Characters**
Values:		*n* = 0 or 1
Default:		1
Description:	E0	Do not echo keyboard input to the terminal.
	E1	Do echo keyboard input to the terminal.

Command:	**&E*n***	**V.42 Error Correction Modes**
Values:		*n* = 0, 1, or 2
Default:		1
Description:	&E0	V.42 non-error correction mode (V.42 disabled).
	&E1	V.42 auto-reliable mode.
	&E2	V.42 reliable mode (V.42 enabled).

Command:	**&E*n***	**Modem-Initiated Flow Control**
Values:		*n* = 3, 4, or 5
Defaults:		4
Description:	&E3	Flow control disabled.
	&E4	CTS/RTS hardware flow control.
	&E5	XON/XOFF software flow control.

Command:	**&E*n***	**XON/XOFF Pass-Through**
Values:		*n* = 6 or 7
Defaults:		6
Description:	&E6	Respond to and discard XON/XOFF characters when **&E5** is selected.
	&E7	Respond to and pass through XON/XOFF characters when **&E5** is selected.

Command:	**&E*n***	**Hewlett Packard ENQ/ACK Pacing**
Values:		*n* = 8 or 9
Default:		8
Description:	&E8	Ignore ENQ/ACK pacing characters.
	&E9	Respond to ENQ/ACK pacing characters.

Command:	**&E*n***	**Non-Error Correction Mode Flow Control**
Values:		*n* = 10 or 11
Default:		10
Description:	&E10	Disable non-error correction mode flow control.
	&E11	Enable non-error correction mode flow control.

Command:	**&E*n***	**Pacing (Computer-Initiated Flow Control)**
Values:		*n* = 12 or 13
Default:		13
Description:	&E12	Pacing disabled.
	&E13	Pacing enabled.

Command:	**&E*n***	**Data Compression**
Values:		*n* = 14 or 15
Default:		15
Description:	&E14	Data compression disabled.
	&E15	Data compression enabled.

Command:	**$E*n***	**V.42 Error Correction at 300 bps**
Values:		*n* = 0 or 1
Default:		0
Description:	$E0	V.42 error correction at 300 bps disabled.
	$E1	V.42 error correction at 300 bps enabled.

Command:	**$EB*n***	**Asynchronous Word Length**
Values:		*n* = 0 or 1
Default:		0
Description:	$EB0	10-bit mode enabled.
	$EB1	11-bit mode enabled.

Command:	**%E*n***	**Escape Sequence Options**
Values:		*n* = 0–5
Defaults:		1 and 4
Description:	%E0	Modem won't escape.
	%E1	**+++AT<CR>** method.
	%E2	**<BREAK>AT<CR>** method.
	%E3	Both **+++AT<CR>** and **<BREAK>AT<CR>** methods.
	%E4	No *OK* response to **+++AT<CR>**.
	%E5	*OK* response to **+++AT<CR>**.

Command:	**&F*n***	**Load Default Configurations**
Values:		*n* = 0, 8, or 9
Default:		8
Description:	&F0	Load factory default values from ROM if **&F8** was previously stored; load user default values from non-volatile memory if **&F9** was previously stored.
	&F8	Read factory default values when **&F** is issued (effective only if you store **&F8** using **&W0**).
	&F9	Read values stored in non-volatile memory when &F is issued (effective only if you store **&F9** using **&W0**).

Command:	**$F*n***	**Enable/Disable Auto-Reliable Fallback Character**
Values:		*n* = 0 or 1
Default:		0
Description:	$F0	Do not fall back to non-error correction mode connect if <CR> is received during handshake.
	$F1	Fall back to non-error correction mode connect if <CR> is received during handshake.

Command:	**%F*n***	**Echo Canceller Frequency Offset Compensation**
Values:		*n* = 0 or 1
Default:		0
Description:	%F0	Disable echo canceller frequency offset compensation.
	%F1	Enable echo canceller frequency offset compensation.

Command:	**#F*n***	**Fallback Modes When On Line**
Values:		*n* = 0, 1, or 2
Default:		2
Description:	#F0	No fallback when on line.
	#F1	Fall back decrementally from maximum speed to 4800 bps as line conditions deteriorate..
	#F2	Fall back decrementally to 4800 bps; fall forward when line conditions improve.

Command:	**&G*n***	**Guard Tones**
Values:		*n* = 0, 1, or 2
Default:		0
Description:	&G0	Turn off ITU-T guard tones.
	&G1	Turn on ITU-T 550 Hz guard tone.
	&G2	Turn on ITU-T 1800 Hz guard tone.

Note: The ZDXK is locked to the ITU-T 1800 Hz guard tone (**&G2**).

Command:	**H*n***	**On Hook/Off Hook**
Values:		*n* = 0 or 1
Default:		None
Description:	H0	Go on hook (hang up).
	H1	Go off hook.

Command:	**$H*n***	**Help Screens**
Values:		*n* = 1, 2, or 3
Default:		None
Description:	$H1	Display Help Screen #1.
	$H2	Display Help Screen #2.
	$H3	Display Help Screen #3.

Command:	**I*n***	**Inquire Product Codes**
Values:		*n* = 0, 1, or 2
Default:		None
Description:	I0	Display modem ID number.
	I1	Display firmware version number.
	I2	Display modem description.

Command:	**#I*x***	**Enter Login Password**
Values:		*x* = password (6–10 characters)
Default:		MULTI-TECH
Description:		Enters the remote configuration login password.

Command:	**#I=*x***	**Store Login Password**
Values:		*x* = password (6–10 characters)
Default:		MULTI-TECH
Description:		Stores a new remote configuration login password.

Command:	**L*n***	**List Commands**
Values:		*n* = 0, 5–8
Default:		None
Description:	L	List stored telephone numbers.
	L5	List current operating parameters.
	L6	List current S-register values.
	L7	List additional current operating parameters.
	L8	List DSP code version number, processor speed, and online diagnostic parameters.
	L9	List signal strength information.

L10	List signal to noise ratio information (SNR).
L11	List noise information.

Note: For L9, L10, and L11, you must first type **+++AT<CR>** (on-line escape command while maintaining command mode), then type the command prefixed by an AT (e.g., **ATL10**).

Command:	**#L*n***	**V.42 Mode Selection in Originate Mode**
Values:		*n* = 0, 1, 2, or 3
Default:		0
Description:	#L0	Modems negotiate V.42 mode.
	#L1	MNP on & LAP-M off.
	#L2	LAP-M on & MNP off.
	#L3	Disable detection phase and go directly to LAP-M.

Command:	**M*n***	**Modem Speaker Control**
Values:		*n* = 0, 1, 2, or 3
Default:		1
Description:	M0	Speaker always off.
	M1	Speaker on until carrier signal detected.
	M2	Speaker always on.
	M3	Speaker on during dialing, off during handshaking.

Command: **$MB*n*** **Modem Baud Rate**
Values: *n* = speed
Default: 28800 (ZDX) or 33600 (ZDXb)
Description:

$MB75	Originate call in ITU-T V.23 mode (ZDXK, ZDXI)
$MB300	Originate call at 300 bps.
$MB1200	Originate call at 1200 bps.
$MB2400	Originate call at 2400 bps.
$MB4800	Originate call at 4800 bps.
$MB7200	Originate call at 7200 bps.
$MB9600	Originate call at 9600 bps.
$MB14400	Originate call at 14,400 bps.
$MB16800	Originate call at 16, 800 bps.
$MB19200	Originate call at 19,200 bps.
$MB28800	Originate call at 28,800 bps.
$MB33600	Originate call at 33,600 bps (ZDXb only).

Command: **N*d*** **Dial a Stored Number**
Values: *d* = 0 or 1
Default: None
Description: Dial stored telephone number *d.*

Command: **N*d*Ne... Number Linking**
Values: *d* = 0 or 1; *e* = 1 or 0
Default: None
Description: Dial stored number *d*; if it is busy, dial stored number *e*.

Command: **O** **Go Back On Line**
Values: n/a
Description: Return to online mode after you have used an escape sequence to go from online mode to command mode.

Command:	**P**	**Pulse Dial**
Values:		n/a
Default:		Yes
Description:		The modem pulse-dials numbers that follow **P** in the dialing command.

Command:	**&P*n***	**Set Pulse Dial Ratios**
Values:		*n* = 0 or 1
Default:		0
Description:	&P0	60:40 break/make pulse ratio.
	&P1	67:33 break/make pulse ratio.

Note: The ZDXK is locked to a 67:33 pulse ratio (**&P1**).

Command:	**Q*n***	**Result Codes Enable/Disable**
Values:		*n* = 0, 1, or 2
Default:		0
Description:	Q0	Enable result codes.
	Q1	Disable result codes (quiet).
	Q2	Enable no-response answer mode, which leaves originate mode intelligent while turning off answer mode responses and echo.

Command:	**&Q*n***	**Multi-Tech or Standard Result Codes**
Values:		*n* = 0 or 1
Default:		0
Description:	&Q0	Multi-Tech responses with modifiers.
	&Q1	Standard AT responses with no modifiers.

Command:	**R*n***	**Reverse Originate/Answer Modes**
Values:		*n* = 0 or 1
Default:		0
Description**:**	R0	Modem will not reverse modes.
	R1	Modem will reverse modes when **R** is added to the dial string.

Command:	**&R*n***	**Clear to Send Control**
Values:		*n* = 0, 1, or 2
Default:		1
Description:	&R0	Let CTS state follow RTS state when on line.
	&R1	Force CTS high (on).
	&R2	Let CTS drop on disconnect for time set by S24, then go high again.

Command:	**&RA*n***	**Asymmetrical Bit Rate**
Values:		*n* = 0 or 1
Default:		0
Description:	&RA0	Enable asymmetrical bit rate in V.34 mode.
	&RA1	Disable asymmetrical bit rate in V.34 mode.

Command:	**&RD*n***	**Square Wave Ring Detect**
Values:		*n* = 0 or 1
Default:		1 (ZDX) 0 (ZDXI, ZDXK)
Description:	&RD0	Modem detects only sine wave rings.
	&RD1	Modem detects both sine and square wave rings.

Command:	**&RF*n***	**CTS/RTS Interaction Control**
Values:		*n* = 0 or 1
Default:		1
Description:	&RF0	Let CTS follow RTS.
	&RF1	Let CTS act independently (use with **&R**).

Command: **&RN** **Rate Negotiation**
Values: n/a
Description: Forces the modem to perform a rate renegotiation while on line. You must escape to command mode to issue this command.

Command: **&RP** **Immediate Line Probe**
Values: n/a
Description: Initiates a retrain that makes the processor read line probe information if %DP1 is selected. Valid only when on line in V.34 mode.

Command: **&RR** **Immediate Retrain**
Values: n/a
Description: Forces the modem to perform an immediate retrain while on line. You must escape to command mode to issue this command.

Command: **$R*n*** **Retransmit Count**
Values: *n* = 0 or 1
Default: 0
Description: $R0 Disconnect after 50 retransmits of a data block.
$R1 Do not disconnect after 50 retransmits.

Command: **S*r*=*n*** **Set Register Value**
Values: *r* = S-register number; *n* varies
Default: None
Description: Set value of register S*r* to value of *n*, where *n* is entered in decimal format.

Command: **S*r*?** **Read Register Value**
Values: *r* = S-register number
Default: None
Description: Read value of register S*r* and display value in 3-digit decimal form.

Command: **&S*n*** **Data Set Ready Control**
Values: *n* = 0, 1, or 2
Default: 1
Description:
&S0 Force DSR high (on).
&S1 Let DSR follow CD.
&S2 DSR drops on disconnect, then goes high again. (Used by some CBX phone systems.)

Command: **&SF*n*** **DSR/CD Interaction Control**
Values: *n* = 0 or 1
Default: 0
Description:
&SF0 Select DSR to follow CD.
&SF1 Select DSR to be independent.

Command: **$SB*n*** **Serial Port Baud Rate**
Values: *n* = speed
Default: 57600
Description:

$SB300	Set serial port to 300 bps.
$SB1200	Set serial port to 1200 bps.
$SB2400	Set serial port to 2400 bps.
$SB4800	Set serial port to 4800 bps.
$SB9600	Set serial port to 9600 bps.
$SB19200	Set serial port to 19200 bps.
$SB38400	Set serial port to 38400 bps.
$SB57600	Set serial port to 57600 bps.
$SB115200	Set serial port to 115200 bps.

Note: Baud adjust must be off (**$BA0**) to enable fixed baud rate.

Command:	**#S*y***	**Enter Setup Password**
Values:		*y*= password (6–10 characters)
Default:		MODEMSETUP
Description:		Enters the remote configuration setup password.

Command:	**#S=*y***	**Store Setup Password**
Values:		*y*= password (6–10 characters)
Default:		MODEMSETUP
Description:		Stores a new remote configuration setup password.

Command:	**T**	**Tone-Dial**
Values:		n/a
Default:		P command
Description:		Modem will tone-dial numbers following a **T** in the dialing command.

Command:	**&T*n***	**Respond to Remote Digital Loopback Signal**
Values:		*n* = 4 or 5
Default:		5
Description:	&T4	Enable response to remote digital loopback signal.
	&T5	Disable response to remote digital loopback signal.

Command:	**#T*n***	**Trellis-Coded Modulation**
Values:		*n* = 0 or 1
Default:		1
Description:	#T0	Disable trellis-coded modulation.
	#T1	Enable trellis-coded modulation.

Command:	**U*n***	**Loopback Test Modes**
Values:		*n* = 0, 1, 2, or 3
Default:		None
Description:	U0	Enable local nalog loopback originate mode.
	U1	Enable local analog loopback answer mode.
	U2	Enable remote digital loopback mode.
	U3	Enable local digital loopback mode.

Command:	**V*n***	**Result Codes (Verbose/Terse)**
Values:		*n* = 0 or 1
Default:		1
Description:	V0	Result codes sent as digits (terse response).
	V1	Result codes sent as words (verbose response).

Command:	**#Vn**	**V.32terbo Handshake Tones**
Values:		*n* = 0 or 1
Default:		1
Description:	#V0	Include V.32terbo tones in handshake.
	#V1	Exclude V.32terbo tones from handshake.

Command:	**W**	**Wait for New Dial Tone**
Values:		n/a
Description:		Inserted in dialing command, causes modem to wait for a new dial tone. (**X2** or **X4** must be selected.)

Command:	**&W*n***	**Store Configuration**
Values:		*n* = 0 or 1
Default:		1
Description:	&W0	Store current settings in NVRAM; load them at power-on or following the **ATZ** command instead of loading the factory defaults from ROM.
	&W1	Clear user default settings from NVRAM.

Command:	**X*n***	**Result Codes and Call Progress Selection**
Values:		*n* = 0–4
Default:		0
Description:	X0	Basic result codes (*CONNECT* only); does not look for dial tone or busy signal.
	X1	Extended result codes (*CONNECT 28800, CONNECT 33600*, etc.); does not look for dial tone or busy signal.
	X2	Extended result codes with *NO DIALTONE*; does not look for busy signal.
	X3	Extended result codes with *BUSY*; does not look for dial tone.
	X4	Extended result codes with *NO DIALTONE* and *BUSY*.

Command:	**#X*n***	**Number of XOFF Characters Sent**
Values:		*n* = 0 or 1
Default:		0
Description:	#X0	Single XOFF character sent after buffer is full.
	#X1	Multiple XOFF characters sent (one for every character received after buffer is full).

Command:	**Y*n***	**Long Space Disconnect**
Values:		*n* = 0 or 1
Default:		0
Description:	Y0	Disable sending or responding to long space break signal on disconnect.
	Y1	Enable sending or responding to long space break signal on disconnect. (Both modems must have **Y1** set.)

Command: **Z** **Modem Reset**
Values: n/a
Description: Reset modem to default values. Defaults come from user NVRAM if **&W0** is set, from factory ROM if **&W1** is set.

Command: **,** **Dialing Pause**
Values: n/a
Description: Placed in dialing command, comma causes dialing pause for time set by S8.

Command: **:** **Continuous Redial**
Values: n/a
Description: Placed at end of dial command, a colon causes continuous redial of a number (10 in DOC modems) until answered. Not used in ZDXK or ZDXI modems.

Command: **;** **Return to Command Mode**
Values: n/a
Description: Placed at end of dial command, a semicolon causes an immediate return to command mode after dialing.

Command: **!** **Flash On-Hook**
Values: n/a
Description: Placed in dial command, exclamation point causes modem to flash on-hook.

Command: @ **Quiet Answer**
Values: n/a
Description: Placed in dial command, @ causes modem to wait for a ringback, then 5 seconds of silence, before processing next part of command.

Command: **$** **Call Card Tone Detect**
Values: n/a
Description: Placed in dial command, causes modem to wait for a call card tone before processing next part of command (such as a call card number).

Command: **%%%AT<CR> Remote Configuration Escape Sequence**
Values: n/a
Description: Initiates remote configuration mode while online with remote modem. The remote configuration escape character (%) is defined in register S13.

Command: **+++AT<CR> Escape Code**
Values: n/a
Description: Puts modem in command mode (and optionally issues a command) while remaining on line. Enter **+++AT**, up to ten command characters (or as defined by S34), and a RETURN. Used mostly to issue hang-up command: **+++ATH<CR>**.

Command: **<BREAK>AT<CR> Escape Sequence**
Values: n/a
Description: Alternate escape method. Puts modem in command mode while remaining on line. Send a **<BREAK>** signal followed by **AT**, up to sixty command characters, and a RETURN. You must set the modem to **%E2** or **%E3** before you can use this escape method.

S-Registers

Certain modem values, or parameters, are stored in memory locations called S-registers. Use the **S** command to read or to alter the contents of S-registers (see previous section).

Register	***Unit***	***Range***	***Default***	***Description***
S0	1 ring	0, 1–255	1	Sets the number of rings until the modem answers. ***ATS0=0*** disables autoanswer completely.
S1	1 ring	0–255	0	Counts the rings that have occurred.
S2	decimal	0–127	43 (+)	Sets ASCII code for the escape code character.
S3	decimal	0–127	13 (^M)	Sets ASCII code for the RETURN character.
S4	decimal	0–127	10 (^J)	Sets ASCII code for the LINE FEED character.
S5	decimal	0–127	8 (^H)	Sets ASCII code for the BACKSPACE character.
S6	1 sec.	2–255 4–255† 4–7‡	2 4† 4‡	Sets the time the modem will wait for a dial tone before aborting a call.
S7	1 sec.	1–255 1–45* 1–55‡	45 45* 55‡	Sets the time the modem will wait for a carrier signal before aborting a call.

* Values for ZDXI modems and ZDX-DOC modems only.
† Values for ZDXI modems only.
‡ Values for ZDXK modems only.

Register	Unit	Range	Default	Description
S8	1 sec.	0–255 4–255† 4–7‡	2 4† 4‡	Sets the length of a pause caused by a comma character in a dialing command.
S9	100 ms	1–255	6	Sets delay between when the modem detects a valid carrier signal and when it turns on its CD circuit.
S10	100 ms	1–254, 255	7	Sets how long a carrier signal must be lost before the modem disconnects. **S10=255** causes the modem to not disconnect with loss of carrier.
S11	1 ms	1–255 80–255* 80–255‡	70 80* 80‡	Sets spacing and duration of dialing tones. 50 ms is the recommended minimum.
S13	decimal	0, 1–127	37 (%)	Sets ASCII code for remote configuration escape character. **S13=0** disables remote configuration.
S17	10 ms	1–255	25	Sets the length of the break time (space) sent to the local PC when the modem receives a remote break.
S24	50 ms	0–255	20	Sets the time the DSR, CTS, and CD signals drop before going high again. Used for some PBX and CBX phone systems.
S25	100 ms	0, 1–255	0	Sets the time the DTR signal must be dropped before the modem

Register	*Unit*	*Range*	*Default*	*Description*
				disconnects. The 0 default equals 50 ms.
S30	1 min.	0, 1–255	0	Sets how long the modem waits after the last character is received or transmitted before it disconnects. The 0 default disables the timer.
S32	100 ms	0–255	20	Sets the time the modem will wait for a RETURN to be entered during escape sequence execution.
S34	1 character	0–60	10	Sets the number of command characters allowed after **+++AT**.
S36	1 sec.	0, 1-255	5	Sets the time between DTR inactive and modem off-hook. **S36=0** disables DTR busy-out.
S37	1 sec.	0-255	5	Sets the time between DTR active and modem on-hook.
S43	decimal	28, 26, 24, 21, 19, 16, 14, 12, 96, or 48	0	Sets fixed V.34 connect speed. 28 = 28800 bps; 26 = 26400 bps;. . . 48 = 4800 bps. 0 default disables this feature.
S48	decimal	33, 31, 28, 26, 24, 21, 19, 16, 14, 12, 96, or 48	0	Sets maximum V.34 connect speed. 33 = 33600 bps; 31 = 31200 bps;. . . 48 = 4800 bps. 0 default disables feature (same as **S48=33**).

Result Codes

In command mode the MT2834ZDX can send responses, or result codes, to your computer. Result codes are used by communications programs and can also appear on your monitor.

AT&Q0 selects Multi-Tech result codes with *RELIABLE, LAPM,* and *COMPRESSED* modifiers (default).

AT&Q1 selects standard AT result codes without modifiers.

&Q0 Multi-Tech Result Codes			**&Q1 Standard AT Result Codes**	
Terse		***Verbose***	***Terse***	***Verbose***
0		*OK*	*0*	*OK*
1		*CONNECT*	*1*	*CONNECT*
2		*RING*	*2*	*RING*
3		*NO CARRIER*	*3*	*NO CARRIER*
4		*ERROR*	*4*	*ERROR*
5	*	*CONNECT 1200*	*5*	*CONNECT 1200*
6		*NO DIALTONE*	*6*	*NO DIAL TONE*
7		*BUSY*	*7*	*BUSY*
8		*NO ANSWER*	*8*	*NO ANSWER*
9		*CONNECT 2400*		
			10	*CONNECT 2400*
11	*	*CONNECT 4800*	*11*	*CONNECT 4800*
12	*	*CONNECT 9600*	*12*	*CONNECT 9600*
13	*	*CONNECT 14400*	*13*	*CONNECT 14400*
19	*	*CONNECT 19200*	*19*	*CONNECT 19200*
21	*	*CONNECT 21600*	*21*	*CONNECT 21600*
24	*	*CONNECT 24000*	*24*	*CONNECT 24000*
26	*	*CONNECT 26400*	*26*	*CONNECT 26400*
28	*	*CONNECT 28800*	*28*	*CONNECT 28800*
31	*	*CONNECT 31200*	*31*	*CONNECT 31200*
33	*	*CONNECT 33600*	*33*	*CONNECT 33600*

*With error correction on, *RELIABLE* (or *R)* or *LAPM* (or *L*) is added to these result codes. With data compression on, *COMPRESSED* (or *C)* is added.

5

Solving Problems

Introduction

Your MultiModemZDX modem was thoroughly tested at the factory before it was shipped. If you are unable to make a successful connection, or if you experience data loss or garbled characters during your connection, it is possible that the modem is defective. However, it is more likely that the source of your problem lies elsewhere. The following symptoms are typical of problems you may encounter:

- None of the LEDs light when the modem is on.
- The modem does not respond to commands.
- The modem dials but cannot connect.
- The modem disconnects while online.
- The modem cannot connect when answering.
- File transfer is slower than it should be.
- Data is being lost.
- There are garbage characters on the monitor.
- Fax and data programs can't run at the same time.

If you experience problems, please check the following possibilities before calling Technical Support (see Appendix C).

None of the LEDs Light When the Modem Is On

When you turn on the ZDX, the LED indicators on the front panel should flash briefly as the modem runs a self-test. If the LEDs remain off, the modem is probably not receiving power.

✔ Make sure the modem's power switch is on, especially if you normally turn on the modem by turning on a power strip.

✔ If the power supply is plugged into a power strip, make sure the power strip is plugged in and its power switch is on.

- ✔ Make sure the power supply module is firmly connected to the modem and to the wall outlet or power strip.
- ✔ If the power strip is on and the modem switch is on, try moving the modem power supply to another outlet on the power strip.
- ✔ Test that the outlet is live by plugging a lamp into it.
- ✔ The modem or power supply may be defective. If you have another Multi-Tech modem, try swapping modems. If the problem goes away, the first modem or power supply may be defective. Call Technical Support for assistance.

CAUTION: Do not under any circumstances replace the power supply module with one designed for another product, as it can damage the modem and void your warranty.

The Modem Does Not Respond to Commands

- ✔ Make sure the modem is plugged in and turned on. (See “None of the Indicators Light when the Modem Is On.”)
- ✔ Make sure you are issuing the modem commands from a data communication program, either manually in terminal mode or automatically by configuring the program. (You cannot send commands to the modem from the DOS prompt.)
- ✔ Make sure you are in terminal mode in your data communication program, then type **AT** and press ENTER. If you get an *OK* response, your connections are good, and the problem likely is in the connection setup in your communication program.
- ✔ Try resetting your modem by turning it off and on. If you are using a DOS or Windows 3.1 communication program, make sure the ini-

tialization string includes **&F** as the first command, to cancel any "leftover' command that could affect the modem's operation.

- ✔ If you don't get an *OK*, the problem may still be in the communication program. Make sure you have done whatever is necessary in your software to make a port connection. Not all communication programs connect to the COM port automatically. Some connect when the software loads and remain connected until the program terminates. Others can disconnect without exiting the program. The modem's TR indicator lights to show that the software has taken control of the modem through the COM port.
- ✔ Your communication program settings might not match the physical port the modem is connected to. The serial cable might be plugged into the wrong connector—check your computer documentation to make sure. Or you might have selected a COM port in the program other than the one the modem is physically connected to—compare the settings in the program to the physical connection.
- ✔ If the modem is on, the cable is plugged into the correct port, the communication program is configured correctly, and you still don't get an *OK*, the fault might be in the serial cable. Make sure it is firmly connected at both ends.
- ✔ Is this the first time you have used the cable? If so, it may not be wired correctly. Check the cable description on the package to make sure the cable is the right one for your computer.
- ✔ Peripheral expansion cards, such as sound and game cards, can include a serial port preconfigured as COM1 or COM2. The extra serial port, or the card itself, may use the same COM port, memory address, or interrupt request (IRQ) as your communications port. Be sure to disable any unused ports.

  To look for address or IRQ conflicts if you use Windows 3.1x, select **File** | **Run** in Program Manager, type **MSD**, and press ENTER.

Then select **Mouse**, **COM Ports**, and **IRQ Status** and note the addresses and IRQs that are in use. If you find an IRQ conflict, note which IRQs are not being used, then change one of the conflicting devices to use one of the unused IRQs. If you find an address conflict, change the address of one of the conflicting devices.

To change a port address or IRQ in Windows 3.1x, double-click the Control Panel icon, then the Ports icon. Click on the port you want to change, click **Settings**, click **Advanced**, and select the new port address and/or interrupt. If you want to use COM3 or COM4, note that COM3 shares an IRQ with COM1, as COM4 does with COM2, so you should change their IRQs to unused ones, if possible.

If you use Windows 95 or 98, right-click on My Computer, select **Properties** from the menu, click on the **Device Manager** tab, double-click on **Ports**, then double-click the communications port your modem is connected to. In the port's **Properties** dialog box, click the **Resources** tab to see the port's input/output range and interrupt request. If another device is using the same address range or IRQ, it will appear in the **Conflicting Device List**. Uncheck **Use automatic settings** to change the port's settings so they do not conflict with the other device, or select the port the conflicting device is on, and change it instead. If you need to open your computer to change switches or jumpers on the conflicting device; refer to the documentation for the device.

If you use Windows NT 4.0, select in turn **Start**, **Programs**, **Administrative Tools (Common)**, and **Windows NT Diagnostics**. In the **Windows NT Diagnostics** dialog box, click on the **Resources** tab to see address and IRQ assignments.

✔ The serial port might be defective. If you have another serial port, install the modem on it, change the COM port setting in your software, and try again.

✔ The modem might be defective. If you have another Multi-Tech modem, try swapping modems. If the problem goes away, the first modem is possibly defective. Call Technical Support for assistance (see Appendix C).

The Modem Dials But Cannot Connect

There can be several reasons the ZDX fails to make a connection. Possibilities include:

- lack of a physical connection to the telephone line.
- a wrong dial tone.
- a busy signal.
- a wrong number.
- no modem at the other end.
- a faulty modem, computer, or software at the other end.
- incompatibility between modems.

You can narrow the list of possibilities by using extended result codes. Extended result codes are enabled by default. If they have been disabled, include **V1X4** in the modem's initialization string, or in terminal mode enter **ATV1X4** and press ENTER. When you dial again, the modem will report the call's progress.

✔ If the modem reports *NO DIALTONE*, check that the modem's telephone line cable is connected to both the modem's LINE jack (not the PHONE jack) and the telephone wall jack. If the cable looks secure, try replacing it. If that doesn't work, the problem might be in your building's telephone installation. To test the building installation, plug a telephone into your modem's telephone wall jack and listen for a dial tone. If you hear a dial tone, your modem might be installed behind a company phone system (PBX) with an internal dial tone that sounds different from the normal dial tone. In that case, the modem might not recognize the dial tone and might treat it

as an error. Make sure your modem's square wave ring detection is turned on (**&RD1**). Check the PBX manual to see if you can change the internal dial tone; if you can't, change your modem's initialization string to replace **X4** with **X3**, which will cause the modem to ignore dial tones. (Note, however, that **X3** is not allowed in some countries, such as France and Spain.)

✔ If the modem reports BUSY, the other number might be busy, in which case you should try again later, or it might indicate that you have failed to add a **9,** prefix to the phone number if you must dial *9* for an outside line.

If you must dial *9* to get an outside line, the easiest way to dial it automatically is to include it in the modem's dial prefix, e.g., **ATDT9,**. Note the comma, which inserts a pause before the number is dialed. By inserting **9,** into the dial prefix, you do not have to include it in each directory entry.

To change the dial prefix in Windows 95 HyperTerminal, select **Connect** from the **Call** menu, click **Dialing Properties**, and type **9** in the local and long distance boxes in **How I dial from this location**.

✔ If the modem reports *NO ANSWER*, the other system has failed to go off-hook, or you might have dialed a wrong number. Check the number.

✔ If the modem reports *NO CARRIER*, the phone was answered at the other end, but no connection was made. You might have dialed a wrong number, and a person answered instead of a computer, or you might have dialed the correct number but the other computer or software was turned off or faulty. Check the number and try again, or try calling another system to make sure your modem is working. Also, try calling the number on your telephone. If you hear harsh sounds, then a modem is answering the call, and the modems might be having problems negotiating because of modem incompatibilities or line noise. Try connecting at a lower speed.

The Modem Disconnects While Online

✔ If you have Call Waiting on the same line as your modem, it can interrupt your connection each time someone tries to call you. If you have Call Waiting, disable it before each call. In most telephone areas in North America, you can disable Call Waiting by preceding the telephone number with ***70** (check with your local telephone company).

You can automatically disable Call Waiting by including the disabling code in the modem's dial prefix (e.g., **ATDT*70,**—note the comma, which inserts a pause before the number is dialed). To change the dial prefix in Windows Terminal, select **Settings** | **Modem Commands**. To change it in Windows 95 HyperTerminal, select **Connect** from the **Call** menu, click **Dialing Properties**, check **This location has Call Waiting**, and select the correct code for your phone service.

✔ If you have extension phones on the same line as your modem, you or someone else can interrupt the connection by picking up another phone. If this is a frequent problem, disconnect the extension phones before using the modem, or order a separate line for the modem.

✔ Check for loose connections between the modem and the computer, the telephone jack, and AC power.

✔ You might have had a poor connection because of line conditions or the problem might have originated on the other end of the line. Try again.

✔ If you were online with a BBS or an online service like CompuServe, it might have hung up on you because of lack of activity on your part or because you exceeded your time limit for the day. Try again.

The Modem Cannot Connect When Answering

✔ Autoanswer might be disabled. Turn on autoanswer in your data-comm program or send the command **ATS0=1** to your modem in terminal mode.

File Transfer Is Slower Than It Should Be

✔ You might have an older UART. For best throughput, install a 16550AFN UART or a Multi-Tech ISI serial port card. See the "Quick Start" chapter for information on how to identify your UART.

✔ If you are running under Windows 3.1 and have a 16550AFN UART, you must replace the Windows serial driver, COMM.DRV, to take full advantage of the UART's speed. (See "The 16550 UART and Windows 3.1" in MultiModemZDX Help.)

✔ If you are using a slow transfer protocol, such as Xmodem or Kermit, try Zmodem or Ymodem/G instead.

✔ Is your line noisy? If there is static on your line, the modem has to resend many blocks of data to insure accuracy. You must have a clean line for maximum speed.

✔ Are you downloading a compressed file with MNP 5 hardware compression enabled? Since hardware data compression cannot compress a file already compressed by an archiving program, the transfer can be marginally slower with data compression enabled than with it disabled. (See "When to Disable Data Compression" in MultiModemZDX Help.)

✔ Try entering the **L8** (List Online Diagnostics) command in online mode, making a screen print of the diagnostics listing, and checking for parameters that may be unacceptable (number of retrains, round trip delay, etc.).

Data Is Being Lost

- ✔ If you are using data compression and a high speed serial port, set the serial port baud rate to four times the data rate.
- ✔ Your UART might not be reliable at serial port speeds over 9600 bps or 19,200 bps. Turn off data compression, reset your serial port speed to a lower rate, or replace your serial port with a faster one.
- ✔ Make sure the flow control method you selected in software matches the method selected in the modem. If you are using the modem with a Macintosh, you might have the wrong cable for hardware flow control.
- ✔ If you are running under Windows 3.1 and have a 16550AFN UART, you might need to turn on the 16550's data buffers and/or replace the Windows serial driver, COMM.DRV. (See "The 16550 UART and Windows 3.1" in the MultiModemZDX Help file.)
- ✔ Try entering the **L8** (List Online Diagnostics) command in online mode, making a screen print of the diagnostics listing, and checking for parameters that may be unacceptable (number of retrains, round trip delay, etc.).

There Are Garbage Characters on the Monitor

- ✔ Your computer and the remote computer might be set to different word lengths, stop bits, or parities. If you have connected at 8-N-1, try changing to 7-E-1, or vice-versa, using your communication software.
- ✔ You might be experiencing line noise. Enable error correction, if it is disabled, or hang up and call again; you might get a better connection the next time.

- ✔ At speeds above 2400 bps, the remote modem might not use the same transmission or error correction standards as your modem. Try connecting at a slower speed or disabling error correction. (With no error correction, however, line noise can cause garbage characters.)
- ✔ Try entering the **L8** (List Online Diagnostics) command in online mode, making a screen print of the diagnostics listing, and checking for parameters that may be unacceptable (number of retrains, round trip delay, etc.).

Fax and Data Programs Can't Run at the Same Time

- ✔ Communications devices can be accessed by only one application at a time. Under DOS or Windows 3.1x, you can run either your fax software or your datacomm software, but not both at the same time, unless you have a special communication device management application. In Windows 95, 98, and NT 4.0, you can have separate data and fax communication applications open at the same time, but they cannot use the same modem at the same time.

Appendixes

Appendix A: Regulatory Compliance

FCC Part 68 Telecom

1. This equipment complies with part 68 of the Federal Communications Commission Rules. On the outside surface of this equipment is a label that contains, among other information, the FCC registration number. This information must be provided to the telephone company.
2. The suitable USOC jack (Universal Service Order Code connecting arrangement) for this equipment is shown below. If applicable, the facility interface codes (FIC) and service order codes (SOC) are shown.
3. An FCC-compliant telephone cord and modular plug is provided with this equipment. This equipment is designed to be connected to the telephone network or premises wiring using a compatible modular jack that is Part 68 compliant. See installation instructions for details.
4. The ringer equivalence number (REN) is used to determine the number of devices that may be connected to the telephone line. Excessive RENs on the telephone line may result in the device not ringing in response to an incoming call. In most, but not all, areas the sum of the RENs should not exceed 5.0. To be certain of the nuber of devices that may be connected to the line, as determined by the total RENs, contact the local telephone company.
5. If this equipment causes harm to the telephone network, the telephone company will notify you in advance that temporary discontinuance of service may be required. But if advance notice is not practical, the telephone company will notify you as soon as possible. Also, you will be advised of your right to file a complaint with the FCC if you believe it is necessary.
6. The telephone company may make changes in its facilities, equipment, operations, or procedures that could affect the operation of the equipment. If this happens, the telephone company will provide advance no-

tice in order for you to make necessary modifications in order to maintain uninterrupted service.

7. If trouble is experienced with this equipment (the model of which is indicated below) please contact Multi-Tech Systems, Inc. at the address shown below for details of how to have repairs made. If the equipment is causing harm to the network, the telephone company may request you remove the equipment from the network until the problem is resolved.
8. No repairs are to be made by you. Repairs are to be made only by Multi-Tech Systems or its licensees. Unauthorized repairs void registration and warranty.
9.

Manufacturer:	Multi-Tech Systems, Inc.
Trade Name:	MultiModemZDX, MultiModemZDXb
Model Number:	MT2834ZDX, MT2834ZDXb
FCC Registration Number:	AU7USA-20673-MM-E
Ringer Equivalence Number:	0.3B
Modular Jack (USOC):	RJ11C or RJ11W (single line)
Service Center in USA:	Multi-Tech Systems, Inc. 2205 Woodale Drive Mounds View, MN 55112 (612) 785-3500 (612) 785-9874 Fax

Fax Branding Statement

The Telephone Consumer Protection Act of 1991 makes it unlawful for any person to use a computer or other electronic device, including fax machines, to send any message unless such message clearly contains the following information:

- Date and time the message is sent
- Identification of the business or other entity, or other individual sending the message
- Telephone number of the sending machine or such business, other entity, or individual

This information is to appear in a margin at the top or bottom of each transmitted page or on the first page of the transmission. (Adding this information in the margin is referred to as *fax branding*.)

Since any number of fax software packages can be used with this product, the user must refer to the fax software manual for setup details. Typically the fax branding information must be entered via the configuration menu of the software.

Canadian Limitations Notice

Notice: The ringer equivalence number (REN) assigned to each terminal device provides an indication of the maximum number of terminals allowed to be connected to a telephone interface. The termination on an interface may consist of any combination of devices subject only to the requirement that the sum of the ringer equivalence numbers of all the devices does not exceed 5.

Notice: The Industry Canada label identifies certified equipment. This certification means that the equipment meets certain telecommunications network protective, operational, and safety requirements. The Industry Canada label does not guarantee the equipment will operate to the user's satisfaction.

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations. Repairs to certified equipment should be made by an authorized Canadian maintenance facility designated by the supplier. Any repairs or alterations made by the user to this equipment or equipment malfunctions may give the telecommunications company cause to request the user to disconnect the equipment.

Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

Caution: Users should not attempt to make such connections themselves, but should contact the appropriate electric inspection authority, or electrician, as appropriate.

Compliance with BABT Requirements

Approved for connection to telecommunications system specified in the instructions for use subject to the conditions set out in them.

Warning: Interconnection directly, or by way of other apparatus, of ports marked “SAFETY WARNING see instructions for use” with ports marked or not so marked may produce hazardous conditions on the network. Advice should be obtained from a competent engineer before such a connection is made.

Telephones that connect to the external socket must be approved for direct connection to the Public Switched Telephone Network (PSTN).

This apparatus has been approved for the use of the following facilities:

- Auto-calling
- Loop disconnect and MF dialing
- Phone number storage and retrieval by a predetermined code
- Operation in the absence of proceed indication
- Automatic storage of last number dialed
- Tone detection-busy
- Auto clear from the originating end
- DTR dialing
- Modem
- PBX timed break register recall

Any other usage will invalidate the approval of the apparatus if, as a result, it then ceases to comply with the standards against which approval was granted.

European Low Voltage Directive

When correctly installed, the modem will present no hazard to the user. When correctly installed, the modem will be connected to the PSTN or a PW and to a Data Terminal Equipment (DTE), whose modem connections comply with ITU-T recommendation V.28. The DTE connections are therefore taken to be safe voltages (less than ±30 volts).

Ports that are capable of connecting to other apparatus are defined as SELV. To ensure conformity with EN60950, ensure that these ports are only connected to ports of the same type on other apparatus.

The main power source shall be installed near to the equipment and shall be easily accessible. The plug that connects the apparatus to the mains power supply must be fitted with a 5A fuse that complies with BS1362.

EMC, Safety, and Terminal Directive Compliance

The CE mark is affixed to this product to confirm compliance with the following European Community Directives:

- Council Directive 89/336/EEC of 3 May 1989 on the approximation of the laws of Member States relating to electromagnetic compatibility;

  and

- Council Directive 73/23/EEC of 19 February 1973 on the harmonization of the laws of Member States relating to electrical equipment designed for use within certain voltage limits;

  and

- Council Directive 98/13/EC of 12 March 1998 on the approximation of the laws of Member States concerning telecommunications terminal and Satellite earth station equipment.

CTR21*

This equipment has been approved by Commission Decision CTR21 for pan-European single terminal connection to the public switched telephone network (PSTN). However, due to differences between the individual PSTNs provided in different countries, the approval does not, of itself, give an unconditional assurance of successful operation on every PSTN network termination point.

In the event of problems, you should contact your equipment supplier first.

Australian Modem Warning Notice

Modems connected to the Australian telecommunications network must have a valid AUSTEL permit. This modem has been specifically configured to ensure compliance with AUSTEL Standards. The following commands can affect compliance and must not be set outside the permissible range.

Modem Commands

Command	Default	Permissible Range
A:	Do not use	—
ATB	B0	Do not change
AT&G	&G2	Do not change
AT&P	&P1	Do not change
ATSn	*see table below*	—

S-Register	Default	Permissible Range
S6	4	2–5

*Applies only to the MT2834ZDXIe model.

Call Attempts/Retries

Applications software shall be configured so that no more than 3 attempts are made to establish a connection to a given number. (Note: if the modem can detect service tones, up to 10 attempts can be made). There must be at least 2 seconds between call attempts. If the call sequence is unsuccessful, there shall be a delay of at least 30 minutes before attempting to call the number again.

Warning: Failure to set the modem, and any communications software used with the modem, to the values shown above will result in the modem being operated in a non-compliant manner. Consequently, there would be no permit in force for this equipment, and the Telecommunications Act 1991 prescribes a penalty of $12,000 for the connection of non-permitted equipment.

Use of Supplied Power Transformer

The power transformer supplied with the modem is the only one that should be used. Use of any other transformer could cause damage to the modem.

For Voice Modems

Distortion may be generated because of low bit rate voice, and reduced voice quality may result.

Warning: For safety reasons, only connect AUSTEL permitted or AUSTEL certified equipment.

New Zealand Telecom Warning Notice

Use of pulse dialing, when this equipment is connected to the same line as other equipment, may give rise to ‘bell tinkle’ or noise and may also cause a false answer condition. Should such problems occur, the user should NOT contact the Telecom Faults Service.

The preferred method of dialing is to use DTMF tones, as this is faster than pulse (decadic) dialing and is readily available on almost all New Zealand telephone exchanges.

Warning Notice: No '111' or other calls can be made from this device during a mains power failure.

Use of Supplied Power Transformer

The power transformer supplied with the modem is the only one that should be used. Use of any other transformer could cause damage to the modem.

Appendix B: Technical Specifications

Your MT2834ZDX fax modem meets the following specifications:

Model Numbers	MT2834ZDX, MT2834ZDXb, MT2834ZDXI, MT2834ZDXK
Data Rates (Modem)	33.6K and 31.2K (ZDXb only), 28.8, 26.4K, 24K, 19.2K, 16.8K, 14.4K, 12K, 9600, 7200, 4800, 2400, 1200 and 0-300 bps
Data Rates (Fax)	14,400, 9600, 4800 and 2400 bps
Data Format (Modem)	Serial, Binary, Asynchronous
Compatibility (Modem)	ITU-T V.34, AT&T V.32terbo, ITU-T V.32bis, V.32, Bell 212A and 103/113, ITU-T V.22, V.22bis, V.29, V.42, V.42bis; V.21& V.23 in international ZDXI versions
Compatibility (Fax)	ITU-T Group 3, T.4, T.30, V.21, V.27ter, V.29, V.17, and EIA TR29.2
Error Correction	ITU-T V.42 (LAP-M or MNP 2, 3 or 4)
Data Compression	ITU-T V.42bis (4:1 throughput) or MNP 5 (2:1 throughput)
Speed Conversion	Serial port data rates adjustable to 300, 1200, 2400, 4800, 9600, 19.2K, 38.4K, 57.6K and 115.2K bps
Mode of Operation	Half or full duplex over dial-up lines; automatic or manual dialing, automatic or manual answer

Flow Control	XON/XOFF, hardware (RTS/CTS), HP (ENQ/ACK)
Intelligent Features	Fully AT command compatible, autodial, redial, repeat dial, pulse or tone dial, dial pauses, call status display, auto parity and data rate selections, keyboard-controlled modem options, on-screen displays for modem option parameters, command lines of up to 60 digits each, and help menus
Command Buffer	60 characters
Modem Modulations	FSK at 300 bps, PSK at 1200 bps, QAM at 2400, 4800, and 9600 bps (non-trellis), QAM with trellis coded modulation (TCM) at 9600, 12K, 14.4K, 16.8K, 19.2K, 21.6K, 24K, 26.4K, 28.8K, 31.2K and 33.6K bps
Fax Modulations	V.21 CH2 FSK at 300 bps, V.27ter DPSK at 2400 and 4800 bps, V.29 QAM at 7200 and 9600 bps, V.17TCM at 7200, 9600, 12K, and 14.4K bps
Carrier Frequencies ITU-T V.34	1600, 1646, 1680, 1800, 1829, 1867, 1920, 1959, 200 Hz
Carrier Frequencies AT&T V.32 terbo/ ITU-T V.32bis/V.32	1800 Hz

Carrier Frequencies V.22bis/V.22 or Bell 212A Standard (2400 & 1200 bps)	Transmit originate:	1200 Hz
	Transmit answer:	2400 Hz
	Receive originate:	2400 Hz
	Receive answer:	1200 Hz
Carrier Frequencies Bell 103/113 (300 bps)	Transmit originate:	1270 Hz mark 1070 Hz space
	Receive originate:	2225 Hz mark 2025 Hz space
	Transmit answer:	2225 Hz mark 2025 Hz space
	Receive answer:	1270 Hz mark 1070 Hz space
Fax Carrier Frequencies	V.21 Ch2 (half duplex): 1650 Hz mark, 1850 Hz space for transmit originate 1650 Hz mark, 1850 Hz space for transmit answer V.27ter: 1800 Hz originate/answer V.29 QAM: 1700 Hz originate/answer V.17 TCM 1800 Hz originate/answer	
Transmit Level	-13 dBm	
Frequency Stability	+/-0.01%	
Receiver Sensitivity	-43dBm under worst case conditions	
AGC Dynamic Range	43 dB	
Interface Connectors	EIA RS-232C/ITU-T V.24/V.28 DB25 RS-232C connector; two RJ-11 phone jacks, power jack	

Cables	One 14-foot RJ-11 phone cable (USA); country-specific cord for UK and International models; external power transformer and cord

Note: Any cables connected to the computer should be shielded to reduce interference.

Diagnostics	Power-on self test, local analog loop, local digital loop, remote digital loop
Indicators	LEDs for Transmit Data, Receive Data, Carrier Detect, 28.8K bps, 14.4K bps, 9600 bps, Off Hook, Terminal Ready, Error Correction, Fax
Speaker	Command-controlled speaker for call progress monitoring
Manual Control	Power switch
Enviromental	Temperature range 0°-50°C (32°-120°F); humidity range 20-90% (non-condensing)
Power Requirements	100-130V AC, 50/60 Hz, 0.1A/5W; two-prong outlet-mounted transformer (included); 230V/50 Hz optional (international)
Dimensions	10.8 cm wide x 14.8 cm long x 2.9 cm high (4.25” x 5.8” x 1.15”)

Appendix C: Warranty, Service, and Technical Support

Limited Warranty

Multi-Tech Systems, Inc. (MTS) warrants that this product will be free from defects in material or workmanship for a period of ten years from the date of purchase or, if date of purchase is not provided, ten years from the date of shipment (limited to customers in the U.S., Canada, Mexico, and United Kingdom). For customers in all other countries, due to certain legal restrictions, MTS warrants that this product will be free from defects in material or workmanship for a period of five years from the date of purchase or, if date of purchase is not provided, five years from the date of shipment, unless otherwise limited or prohibited by law.

MTS MAKES NO OTHER WARRANTY, EXPRESSED OR IMPLIED, AND ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE HEREBY DISCLAIMED.

This warranty does not apply to any products that have been damaged by lightning storms, water, or power surges, or that have been neglected, altered, abused, used for a purpose other than the one for which they were manufactured, repaired by the customer or any party without MTS's written authorization, or used in any manner inconsistent with MTS's instructions.

MTS's entire obligation under this warranty shall be limited (at MTS's option) to repair or replacement of any products that prove to be defective within the warranty period, or, at MTS's option, issuance of a refund of the purchase price. Defective products must be returned by Customer to MTS's factory with transportation prepaid.

MTS WILL NOT BE LIABLE FOR CONSEQUENTIAL DAMAGES AND UNDER NO CIRCUMSTANCES WILL ITS LIABILITY EXCEED THE PURCHASE PRICE FOR DEFECTIVE PRODUCTS.

Service

If you are outside the USA, your local distributor of Multi-Tech products normally offers the quickest and most economical repair option. If necessary, you may send your modem to our Mounds View factory in the USA. A modem that is shipped to us from outside the USA must have a Returned Materials Authorization (RMA) and shipping instructions. To return a modem for repair from inside the USA, no RMA is required; simply send it to us freight prepaid. Include a description of the problem, a return shipping address, and a check or purchase order for out-of-warranty repairs.

Please send modems that require repairs to the following address:

Multi-Tech Systems, Inc.
2205 Woodale Drive
Mounds View, MN 55112
Attn: Repair

If you are shipping from outside the USA, please contact our Repair Department for an RMA prior to your shipment. You can contact us by telephone at +(612) 785-3500 or by fax at +(612) 785-9874.

Technical Support

Multi-Tech Systems has an excellent staff of technical support personnel available to help you get the most out of your Multi-Tech product. If you have any questions about the operation of this unit, please call (800) 972-2439 (USA and Canada) or (612) 785-3500 (international and local). Please have modem information available. You can also contact Technical Support through the following URL:

http://www.multitech.com/_forms/email_tech_support.htm

Online Warranty Registration

If you have access to the World Wide Web, you can register your Multi-Tech product online at the following URL:

http://www.multitech.com/register/

The Multi-Tech BBS

For customers who do not have Internet access, Multi-Tech maintains a bulletin board system (BBS) that mirrors its FTP site. Information available from the BBS includes new product information, product upgrade files, and problem-solving tips. The phone number for the Multi-Tech BBS is (800) 392-2432 (USA and Canada) or (612) 785-3702 (international and local).

The BBS can be accessed by any asynchronous modem operating at 1200 bps to 33,600 bps at a setting of 8 bits, no parity, and 1 stop bit (8-N-1).

To Log on to the Multi-Tech BBS

1. Set your communications program to **8-N-1**.
2. Dial our BBS at (800) 392-2432 (USA and Canada) or (612) 785-3702 (international and local).
3. At the prompts, type your first name, last name, and password; then press ENTER. If you are a first time caller, the BBS asks if your name is spelled correctly. If you answer yes, a questionnaire appears. You must complete the questionnaire to use the BBS on your first call.
4. Press ENTER until the Main Menu appears. From the Main Menu you have access to two areas: the File Menu and News. For help on menu commands, type **?**.

To Download a File

If you know the file name

1. From the Main Menu, type **F** to access the File Menu, then type **D**.
2. Enter the name of the file you wish to download from the BBS.
3. If a password is required, enter the password.
4. Select a file transfer protocol by typing the indicated letter, such as **Z** for Zmodem (the recommended protocol).
5. If you select Zmodem, the transfer will begin automatically. If you select another protocol, you may have to initiate the transfer yourself. (In most datacomm programs, the PAGE DOWN key initiates the download.)
6. When the download is complete, press ENTER to return to the File Menu.
7. To exit the BBS, type **G** and press ENTER.

If you don't know the file name

1. From the Main Menu, type **F** to access the File Menu. For a list of file areas, type **L**, press ENTER, then type **L** and press ENTER again. (If you do not type the second *L*, you will list all of the files on the BBS.)
2. Mark each file area you would like to examine by typing its list number and pressing ENTER.
3. Type **L** and press ENTER to list all the files in the selected file areas. Type **C** to go forward in the file list, and **P** to go back.
4. To mark one or more files for download, type **M**, press ENTER, type the list numbers of the files, and press ENTER again.

5. Type **D** and press ENTER. You will see a list of the files you have marked. Type **E** if you would like to edit the list; otherwise type **D** again to start the download process.
6. Select a file transfer protocol by typing the indicated letter, such as **Z** for Zmodem (the recommended protocol).
7. If you select Zmodem, the file will transfer automatically. If you select another protocol, you may have to initiate the transfer yourself. (In most data communications programs, the PAGE DOWN key initiates the download.)
8. When the download is complete, press ENTER to return to the File Menu.
9. To exit the BBS, type **G** and press ENTER.

About the Internet

Multi-Tech maintains a World Wide Web site at:

http://www.multitech.com

and an ftp site at:

ftp://ftp.multitech.com

You can contact Technical Support via the Web at the following address:

http://www.multitech.com/_forms/email_tech_support.htm

About the Multi-Tech Fax-Back Service

Multi-Tech's fax-back system provides 24-hour access to sales, marketing, and technical literature for customers in the U.S.A. Dial (612) 717-5888, follow the voice prompts, and enter the document number for either the Sales and Marketing catalog or the Technical Support catalog of documents. For convenience, write your fax number in the following space: _____.

From the Sales and Marketing catalog, you can request to have newsletters, white papers, press releases, brochures, and other marketing literature faxed to you. From the the Technical Support catalog, you can request basic modem operation information and troubleshooting guides. With either catalog, simply enter the FB Doc. number of the literature you wish to receive.

MT2834ZDXb Data Rates